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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,625	06/24/2003	James K. Baker	089348-0125	1108

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EXAMINER	
SHORTLEDGE, THOMAS E	
ART UNIT	PAPER NUMBER
2626	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/601,625	BAKER, JAMES K.	
	Examiner	Art Unit	
	Thomas E. Shortledge	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-25 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-25 are pending in the present application.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claims 1 and 21, the following is the analysis that was performed: Does the claimed invention fall within a §101 judicial exception - law of nature, natural phenomena or abstract idea? Yes, the claimed limitations describe an algorithmic process, and thus correspond to an abstract idea. Does the claimed invention cover a §101 judicial exception, or practical application by producing a physical transformation or a tangible result? No. The final step is "evaluating said at least one hypothesis..." which is neither a physical transformation nor a tangible result. Claim 1 merely transforms data, which is not a physical transformation, nor does it produce a "real world" result. Thus claim 1 is non-statutory under §101.

Furthermore, although claims 11 and 25 each refer to a data processing arrangement within an apparatus, the inventive concept corresponds to a similar algorithmic process as described in claims 1 and is rejected for the same reasons: the lack of a practical application producing a physical transformation or tangible result.

Claim 21 is further rejected under 35 U.S.C. 101 because the claimed invention states in the preamble "a program product having machine readable code for performing speech recognition, the program code, when executed, causing a machine to perform the following steps" where it is obvious from that the scope was intended to include that the program product can be a medium used to carry the program code in the form of computer-executable instructions over a communications connection, including a wireless connection (see specification, pages 5-6). This gives evidence that the computer-executable instructions can be stored as a signal, directing the claim to non-statutory subject matter.

Claims 2-10, 12-20 and 22-24 are rejected for failing to cure the deficiencies of their respective parent non-statutory claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Chou et al. (5,805,772).

As to claims 1, 11 and 21, Chou et al. teach:

a computer with program instructions (col. 4, lines 40-50);

obtaining a set of acoustic observations (extracting feature vectors, col. 6, lines 16-18);

obtaining a list of target speech element sequences each containing at least one speech element (identifying target word strings to be recognized, the word strings containing at least one word, col. 6, lines 15-25);

for each target speech element sequence obtaining a forward sequence extension model and a backward sequence extension model (creating a forward and backward prediction model, col. 6, lines 46-64);

spotting at least one spotted target speech element sequence by matching the sequence of speech element models against the set of acoustic observations (identifying a word string to recognize by matching the feature vectors against a language model, col. 6, lines 10-20);

obtaining from the set of acoustic observations the set of acoustic observations preceding the said at least one spotted target speech element sequence and the set of acoustic observations following the said at least one spotted target speech element

sequence (identifying the feature vectors forward and backward from the target string to be predicted, col. 6, lines 10-20 and 49-60);

obtaining at least one hypothesis of a longer speech element sequence containing the said at least one spotted speech element sequence as a proper subsequence in which said at least one longer speech element sequence is consistent with at least one of said forward sequence extension model and said backward sequence extension model for said at least one spotted speech element sequence (predicting a word string hypothesis sequence, containing the target word string and words forward and backward from that word string to produce a longer word string sequence, col. 11, lines 45-65); and

evaluating said at least one hypothesis of a longer speech element sequence based on the degree of acoustic match between said longer speech element sequence and at least one of said set of acoustic observations preceding the said at least one spotted target speech element sequence and the set of acoustic observations following the said at least one spotted target speech element sequence (evaluating the word string sequence hypothesis to find the best word string sequence, based on a calculated global score, the global score being determined by the estimate of the best connection path, time and tail, and the connection of the head (the preceding and following words from the target word string) col. 11, lines 42-55).

As to claims 2, 12 and 22, Chou et al. teach:

spotting a plurality of spotted target speech element sequences in the set of acoustic observations (determining a set of words to be predicted from the inputted speech feature vectors, col. 6, lines 15-25 and Fig. 4, element 402, (for each word));

determining, for each spotted speech element sequence and each hypothesized longer speech element sequence, the set of acoustic observations that correspond to the speech interval for said speech element sequence (determining for each word utterance in continuous speech recognition the feature vectors, for a frame of speech to be identified, col. 6 lines 10-20 and Fig. 4, element 402);

detecting when the set of acoustic observations for a first speech element sequence and the set of acoustic observations for a second speech element sequence correspond to adjacent speech intervals (during continuous speech recognition, detecting an entire speech utterance, and once, a first word string is detected, detected the next word string to be recognized, col. 4, lines 40-55, col. 6, lines 7-25, col. 11, lines 40-60); and

creating a combined speech element sequence by concatenating said first speech element sequence and said second speech element sequence (creating a combined speech utterance from continuous speech input, col. 11, lines 40-60, and finding more than one input word string to create an entire utterance, Fig. 4, element 402).

As to claims 3, 13 and 23, Chou et al. teach:

obtaining from the set of acoustic observations the set of acoustic observations preceding the said at least one combined speech element sequence and the set of acoustic observations following the said at least one combined speech element sequence (finding the feature vectors for the target word strings, col. 6, lines 15-25);

obtaining at least one hypothesis of a longer speech element sequence containing the said at least one combined speech element sequence as a proper subsequence in which said at least one longer speech element sequence is consistent with at least one of said forward sequence extension model of the spotted target speech element sequence contained in said second speech element sequence and said backward sequence extension model for the spotted target speech element sequence contained in said first speech element sequence (finding backward and forward sequences for the target word strings, creating from the backward and forward predictions at least one hypothesis of a longer element, containing the target speech word string, col. 6, lines 48-55, col. 7, lines 25-34, col. 10, lines 14-24, and col. 11, lines 26-40); and

evaluating said at least one hypothesis of a longer speech element sequence based on the degree of acoustic match between said longer speech element sequence and at least one of said set of acoustic observations preceding the said at least one combined speech clement sequence and the set of acoustic observations following the said at least one combined speech element sequence (evaluating the word string sequence hypothesis to find the best word string sequence, based on a calculated global score, the global score being determined by the estimate of the best connection

path, time and tail, and the connection of the head (the preceding and following words from the target word string) col. 11, lines 42-55).

As to claims 4, 14 and 24, Chou et al. teach:

repeating said processes of obtaining at least one hypothesis of a longer speech element sequence, and said evaluating said at least one hypothesis, and said determining of said sets of corresponding acoustic observations, until there is at least one pair of a first speech element sequence and a second element sequence for which it is detected that said first speech element sequence and said second element sequence correspond to adjacent speech intervals (performing the process of creating and evaluating at least one hypothesis, from a determined set of feature vectors, finding an adjacent word strings, used in recognizing the complete speech utterance, col. 6, lines 9-25, lines 48-55, col. 7, lines 12-20, col. 10, lines 14-27, and col. 11, lines 40-50);

creating said combined speech element sequence (creating sequence, col. 11, lines 45-65); and

repeating said processes of obtaining and evaluating said longer speech element sequence and of creating said combined speech element sequences until there is at least one hypothesized speech element sequence that corresponds to the complete set of acoustic observations (using the process of forward and backward prediction to create a complete speech utterance, based on the input feature vectors, col. 6, lines 15-25, and col. 11, lines 45-56).

As to claims 5 and 15, Chou et al. teach:

obtaining a grammar of the allowed speech element sequences (rules, definitions and explanations for the words, col. 4, lines 60-63);

for each allowed target speech element sequence, determining from the grammar the set of predecessor speech element sequences that may precede said target speech element sequence as adjacent subsequences in an allowed speech element sequence (for each word string, determining from the set of rules and word definitions, sequences that precede the target word string, col. 4, lines 60-63, and col. 10, lines 14-25);

creating a backward sequence extension model for said target speech element sequence from said set of predecessor speech element sequences (creating a backward word sequence, col. 10, lines 14-25);

for each target speech element sequence, determining from the grammar the set of successor speech element sequences that may follow said target speech element sequence as adjacent subsequences in an allowed speech element sequence; and creating a forward sequence extension model for said target speech element sequence from said set of successor speech element sequences (using the rules and word definitions, to create a forward sequence prediction string, the forward sequence prediction string based on the target word string, col. 6, lines 15-25 and col. 7, lines 14-34).

As to claims 6 and 16, Chou et al. teach wherein said speech element sequences are word sequences and said grammar of allowed word sequences (rules defining the definitions of possible word sequences, and the elements are word strings, col. 4, lines 60-65 and col. 6, lines 14-25).

As to claims 7 and 17, Chou et al. teach wherein each target speech element sequence is a target phoneme sequence (col. 5, lines 5-8), and wherein the method further comprising:

obtaining a vocabulary list of speech elements each of which is a sequence of phonemes (obtaining a list of possible sequences of phonemes, a phoneme word model, col. 5, lines 15-20);

for each target phoneme sequence, determining from said vocabulary list the set of predecessor phoneme sequences that may precede said target phoneme sequences as an adjacent phoneme subsequence in the set of phoneme sequences in said vocabulary list; creating a backward sequence extension model for said target phoneme sequence from said set of predecessor phoneme sequences (using a phoneme model to create a backward prediction string, col. 5, lines 14-24 and col. 10, lines 14-20); and

for each target phoneme sequence, determining from said vocabulary list the set of successor phoneme sequences that may precede said target phoneme sequences as an adjacent phoneme subsequence in the set of phoneme sequences in said vocabulary list (using a phoneme model to create a forward prediction string, col. 5,

lines 14-24 and col. 6, lines 45-60).

As to claims 8 and 18, Chou et al. teach wherein the set of acoustic observations is a sequence (the set of acoustic observations is a sequence, col. 6, lines 14-24), and wherein the method further comprising:

performing a sequence speech recognition search substantially with said spotting of at least one target speech element sequence; and using said spotting of at least one speech element sequence to enhance said sequential speech recognition search (once the speech utterance is inputted, the target word is spotted, and recognition is carried out, col. 6, lines 14-25).

As to claims 9 and 19, Chou et al. teach said sequential search is a priority queue search (using a priority search, col. 30-40).

As to claims 10 and 20, Chou et al. teach said sequential speech recognition search is a frame synchronous beam search (col. 6, lines 38-42).

As to claim 25, Chou et al. teach:

receiving a set of acoustic observations, and performing a speech recognition on the set of acoustic observations (extracting feature vectors, col. 6, lines 16-18);

at the same time the speech recognition is being performed, determining whether or not an n-gram of speech elements occurs in the set of acoustic observations, wherein

n is an integer greater than or equal to one (when the speech is received determining whenever a bi-gram of speech element occurs in the set of feature vectors, col. 6, lines 10-20, col. 7, lines 15-20);

if the determination is that an n-gram occurs, then performing at least one of a backward search and a forward search using a continuation tree that represents allowable continuations in a grammar that may precede or follow the spotted n-gram (creating a forward and backward prediction tree from a found bi-gram, the forward and backward prediction representing allowable word strings, col. 7, lines 15-25 and col. 10, 14-26); and

determining a best matching path in the continuation tree with respect to the set of acoustic observations (determining the best matching path, col. 11, lines 45-65).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas E. Shortledge whose telephone number is (571)272-7612. The examiner can normally be reached on M-F 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)272-7602. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TS
3/1/07

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER